

NRCS Golden Meadow Plant Materials Center 2007 Progress Report of Activities

United States
Department of
Agriculture

Natural Resources
Conservation
Service

Golden Meadow
Plant Materials
Center

Galliano
Louisiana

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The USDA, Natural Resource Conservation Service Golden Meadow Plant Materials Center (PMC) in Galliano, Louisiana has been a leader in coastal wetland plant restoration and technology development. Currently, Louisiana loses 25 to 35 square miles of marsh a year or an acre every 25 minutes. This accounts for 90% of the nation's annual coastal wetland loss. Coastal wetland remediation, restoration, and enhancement with vegetation released by the Golden Meadow PMC has proven effective in reducing the conversion of marsh to open water, reducing soil erosion, and promoting re-establishment of emergent vegetation.



The Golden Meadow PMC is located within the Barataria-Terrebonne Estuary, which is the largest and most productive estuarine system in the United States. This is essentially a living laboratory from which to study and advance coastal wetland plant technology.

The Golden Meadow PMC selects conservation plants and develops innovative planting technology to solve the nation's most important resource concerns. Our mission is to develop, test, and transfer effective state-of-the art plant science technology to meet customer and resource needs.

An Eventful Year

Richard 'Doc' Neill was away for six months with complications from multiple knee surgeries. Garret Thomassie was promoted to acting manager and Morris Houck our State Plant Materials Specialist assisted with the management of the Plant Material Center.

Thanks to Morris' experience as a plant materials center manager and Garret's intimate knowledge of the Golden Meadow Center and it's eccentricities the center was able to do well through our Quality Assurance Review. For the review Bob Escherman, National Program Leader, Plant Materials; Joel Douglas, Regional Plant Materials Specialist; Kevin Norton, LA State Conservationist; John Hall, MD State Conservationist; and Steve Carmichael, LA State Resource Conservationist were present.

We develop and transfer plant materials and plant technology for the conservation of natural resources. In working with a broad range of plant species, including grasses, forbs, trees, and shrubs, the program seeks to address priority needs of field offices and land managers in both public and private sectors. Emphasis is focused on using native plants as a sustainable way to solve conservation problems and protect ecosystems.

If you would like more information call us at (985) 475-5280 or visit our web site at <http://Plant-Materials.nrcs.usda.gov>

Golden Meadow Plant Materials Center Releases

‘Vermilion’ smooth cordgrass (*Spartina alterniflora*)
 Brazoria seashore paspalum (*Paspalum vaginatum*)
 Pelican black mangrove (*Avicennia germinans*)
 Fourchon bitter panicum (*Panicum amarum*)
 Caminada seaoats (*Uniola paniculata*)
 ‘Gulf Coast’ marshhay cordgrass (*Spartina patens*)
 ‘Timbalier’ gulf bluestem (*Schizachyrium maritimum*)

New Release

Bayou Lafourche Germplasm California Bulrush [*Schoenoplectus californicus* (C.A.Mey) Palla] was released as a select ecotype of California bulrush.

An Accelerated Program of Woody Plant Species Selection for Conservation, Restoration, and Neotropical Habitat Enhancement

Initiated: 2001 **Status:** Active

Cooperators: Barataria-Terrebonne National Estuary Program (BTNEP), Louisiana Universities Marine Consortium, and Greater Lafourche Port Commission

The PMC began an initiative to identify native woody plant species suitable for coastal restoration and remediation activities. The overall goal is to implement a program to develop woody plant species technology; to provide plant species information to coastal wetland managers; and to demonstrate methods for improving plant species diversity and improve wildlife habitat.

Seeds of ten species identified by the Barataria-Terrebonne Estuary Program Action Plan Committee have been collected from native populations found growing in coastal Louisiana. Germination requirements have been investigated and germinated seeds transplanted to containers for grow out. The species were planted to determine adaptation and performance on a barrier island, dedicated sediment disposal site, brackish marsh, protected bay, and the Plant Materials Center.

Species selected for evaluation include: hackberry (*Celtis laevigata*), live oak (*Quercus virginiana*), wax myrtle (*Morella cerifera*), Hercules-club (*Zanthoxylum clava-herculis*), red mulberry (*Morus rubra*), yaupon (*Ilex vomitoria*), American beautyberry (*Callicarpa americana*), sweet acacia (*Acacia farnesiana*), honeylocust (*Gleditsia triacanthos*), and persimmon (*Diospyros virginiana*). Germination of yaupon seed is difficult and plant materials were not available at planting time. Roughleaf dogwood (*Cornus drummondii*) has been substituted in all field evaluation plantings. Jerusalem thorn (*Parkinsonia aculeate*) was added to all field plantings. Survival and plant performance varies among planting sites.

Following hurricanes Katrina and Rita, all of the plantings appeared to be damaged. No significant survival was noted this year. However, from our experience with woody perennials, at least one more year's observation will be required to determine if the roots will produce new growth.

This year we have focused on methods of transplanting live oak and wax myrtle. Experiments include soil amendments to reduce salinity and pruning to reduce top biomass. Our hopes are that the root mass will become established and not be encumbered by a large transpiration surface area.

We believe that the Ph and total salinity have led to problems of previous planting and that the drought in the past few years prevented the plants ability to maintain top growth.

A second ridge is being constructed and we anticipate participating in further studies on “jump starting” revegetation.

Evaluation of post-harvest sugarcane field residue for sand fence alternatives and sand dune formation and stabilization

Begin: 2003 **Status:** Active

Cooperators: USDA - Agriculture Research Service (ARS) Sugarcane Research Unit

Sand fences have proven to be an effective low-cost solution to creating and enhancing low profile dunes on coastal beaches. Sand dunes in turn support important herbaceous plant species. The objective of this project is to evaluate alternative methods to catch, accrete, and stabilize blowing sands using hay bales and beneficial plant materials. In cooperation with the ARS Sugarcane Research Unit, tests are being conducted using baled sugarcane post harvest field residue and bitter panicum (*Panicum amarum*) vegetative propagules to stabilize and enhance dune formation.

Following encouraging results from previous years, 400 bales of sugar cane residue were provided by the Agricultural Research Service Sugar Cane Research Unit for further trials. The bales were placed to form a 50 yards long barrier, three feet wide and three feet high, with interlocking bales. Plantings of bitter panicum (*Panicum amarum*) were installed but as yet not evaluated. Initial evaluations of the stability of the "fence" indicate that bales should be placed away from active flow areas (wash over areas) or perhaps should be anchored if tidal flow regularly reaches the installation.

The bales have been very effective in trapping sand and establishing vegetative cover. The logistics however are much more complicated and expensive (considering labor) than building sand fencing.

A Vegetative Model for Restoration, Conservation, and Habitat Enhancement on Beneficial-Use Dredge Sediments

Begin: 2002 **Status:** Active

Cooperators: LSU AgCenter, BTNEP, and Greater Lafourche Port Commission

The primary goal of this study is to develop baseline information on environmental parameters affecting the selection, establishment, and growth of plant species for dredge-restored sites. Objectives of the study are: 1) to initiate steps which reduce the time required for the establishment of productive plant communities on dredge materials; 2) to develop methods to re-vegetate and manage dredge materials that will support increased plant species-rich habitat than currently being realized; 3) to provide planners, designers and builders with management strategies that incorporate an ecological and environmental perspective into dredge-material engineering.

Various field plantings have been established in cooperation with the LSU AgCenter and the Greater Lafourche Port Commission on a 230 acre dredge-restored site at Port Fourchon, Lafourche Parish, Louisiana. Evaluation plantings have been established to study: 1) aerial seeding techniques for the establishment of smooth cordgrass (*Spartina alterniflora*), 2) vegetative establishment of black mangrove (*Avicennia germinans*) in relation to elevation, 3) planting and performance of selected tree and shrub species, 4) planting and evaluation of salt tolerant wheat strains as a potential cover crop, and 5) planting and evaluation of selected native plant materials for use on areas where vegetation has not colonized naturally. Areas that lie between tidal/wet soil and upper elevations are more difficult areas to get vegetation established.

Local seed source woody plants have shown some vigor after several years of establishment. We are trying to make as many coastal collections as possible.

Due to storm surge during the storms, many plot boundaries were lost, but herbaceous vegetation had recovered and spread onto newly created sites. Live oak (*Quercus virginiana*) that had been established for several years was able to survive inundation with salt water.

Current trials are established to determine which seed sources are best suited to planting this very difficult substrate. The dredge material consists of material taken from the bayou where harbor facilities are being constructed and may contain mostly oyster shells or be a silt and clay mixture which separates into strata during the dewatering process.

Establishment and management techniques of *Spartina alterniflora* for improved seed production

Begin: 2000 **Status:** Active

Typically conservation plantings of smooth cordgrass (*Spartina alterniflora*) in coastal Louisiana have been accomplished with expensive and labor-intensive containerized or bareroot plant materials. A more efficient and economical method of establishing *S. alterniflora* especially for large-scale plantings would be by planting seed. The purpose of this study is to develop improved methods and technology for the establishment, management, and harvesting of *S. alterniflora* seed production fields.

Vegetative stems of *S. alterniflora* 'Vermilion' have been planted in a 1.4 acre constructed pond using a mechanical transplanter. A row culture is maintained on 40-inch centers. Management techniques are being tested to improve seed production. Fertilization, insect and weed control, and the annual removal of standing dead biomass are being evaluated for the benefits of stand health, longevity as a perennial crop, and seed production.

We coauthored with LSU AgCenter an article on strains of *S. alterniflora* which are high viable seed producers.

Submersed Aquatic Vegetation Propagation and Planting Techniques for Restoration in Coastal Louisiana

Begin: 2007 **Status:** Active

In cooperation with Barataria Terrebonne National Estuary Program, the Golden Meadow Plant Materials Center, a project to develop technology to grow and plant submersed aquatic plants is being conducted. The focus of the study is to take *Vallisneria* and *Ruppia* from local sources. We will develop techniques to grow these plants in a manner suitable to commercial growers and test several techniques of planting in the wild.

Points to be tested will be nursery growth under various shading regimes to determine vigor and algae control, chemical shading and weed control.

Substrates will be tested to determine suitability for nursery growth and transplant efficacy. These include various mats (e.g. coconut fiber) and simple cloth bags.

If successful we hope to be able to provide information to producers and contractors on means of successfully providing further protection for the shallow open waters of our coast line.

Assemblies and Evaluations

Evaluation of giant bulrush (*Schoenoplectus californicus*) for asexually propagated cultivar (2000)

Schoenoplectus californicus has proven effective as a wave barrier for shoreline protection and stabilization. This native freshwater emergent plant is also important for stabilizing and restoring disturbed or degraded wetland areas, and for wildlife food and cover. There is a need for a tested and proven cultivar for conservation use in coastal Louisiana. Native populations were identified and vegetative propagules collected throughout coastal Louisiana in 1999. Forty-nine collections have been vegetatively propagated and increased for performance plantings on and off the PMC. Field evaluation plantings have been planted in Cameron Parish, Jefferson Parish, and PMC. Plant performance documentation is being evaluated for a potential selected class vegetative release in 2005.

Field plantings have not been re-evaluated in 2006. Propagation techniques and growth data were collected from provenance trials on the PMC which identified several candidates for further planting trials.

Further work with California Bulrush is ongoing with the Louisiana State University AgCenter Rice Research Station to identify strains of Bulrush that exhibit salt tolerance. The work attempts to identify DNA markers associated with salt tolerance and verified with field testing.

One germplasm was released in 2007 and we are looking for more releases relevant to various salinities in our coastal conservation efforts.

Assembly and evaluation of coastal ecotypes of switchgrass (*Panicum virgatum*) (2002)

Panicum virgatum is an important native prairie species. This species is found on occasion growing in coastal marshes of Louisiana. Several ecotypes have been found growing in saline and brackish marshes mainly on ridges and at higher marsh elevations. Samples taken from specimen plants found in these areas are being vegetatively increased for assembly for future evaluation and potential use in coastal conservation.

Assembly and evaluation of Saltgrass (*Distichlis spicata*) (2004)

Distichlis spicata is a native perennial low-growing grass that often forms dense colonies on slightly elevated saline and brackish marshes along the Louisiana coast. There is interest in this species for conservation plantings because of its salt tolerance, soil stabilizing characteristics, wildlife value, contribution to the detrital cycle, and conservation plant biodiversity. An assembly of Louisiana ecotypes was initiated in 2004. The assembly continues with twelve collection sites accessioned and vegetatively increased.

Distichlis accessions have been through increase for outplanting trials.

Quercus Seed Germination Trial

Live oak seed from various sites in Louisiana were assembled at the PMC. Germination under oak leaf mulch and various temperature regimes were compared.

Louisiana Native Plant Initiative

There is a growing interest from public and private sectors to utilize locally adapted native plant materials for restoration and revegetation projects in Louisiana. On April 22, 2004 a Memorandum of Understanding (MOU) was signed to formalize a partnership to develop a comprehensive plant materials program to collect, increase, and release locally adapted species of native grasses, forbs, and legumes.

The MOU is with the NRCS Plant Materials Program, McNeese State University, Nicholls State University USGS National Wetlands Research Center and Coastal Plain Conservancy. Native plants currently in production include: little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), rattlesnake master (*Eryngium yuccifolium*), cluster bushmint (*Hyptis alata*), Texas coneflower (*Rudbeckia texana*), black wand root (*Pterocaulon virgatum*), and wooly rose mallow (*Hibiscus lasiocarpus*). There are also 62 other species under initial evaluation in a common garden.

The Louisiana Native Plant Initiative is leading to further cooperation with Nicholls State and is generating interest in more plantings in conservation efforts. Several of our wetland growers have expressed interest in growing seed. We are presently working with Nicholls State University to develop land for seed production that will become commercial product in the next few years.